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United States Department of Agriculture, BUREAU OF PLANT INDUSTRY,

Seed and Plant Introduction and Distribution,

WASHINGTON, D. C.

CIRCULAR OF INFORMATION TO ACCOMPANY SEED OF WILT- RESISTANT UPLAND COTTON, 1907.

ORIGIN.

Two varieties of cotton resistant to wilt, or black-root, have been developed by the United States Department of Agriculture. The method practiced has been one of seed selection. Starting with a few plants that remained healthy in an infected field, the seed obtained was planted the next year in a badly diseased spot, and all plants that developed the wilt discarded. This selection has been repeated each year until a high degree of resistance has been secured.

Neither of the two varieties is entirely immune. Occasional plants will be diseased, and on land where the wilt is extremely severe or where root-knot is also present considerable wilt may appear. Note the advice given for such cases in a later paragraph.

DESCRIPTIONS.

Jackson wilt-resistant cotton.—This was developed from the Jackson limbless variety. The original race was more wilt resistant than other kinds tested, and this quality has been greatly intensified by the rigid selection practiced since 1900, so that at the present time it is essentially a different variety, though the general characters of the old Jackson have been retained.

The plant is nearly limbless, except for one or two large basal branches, erect, tall, bolls medium sized, clustered, seed small, gray. A very productive variety. The bolls open well, but hold the seed cotton firmly. For this reason it is never blown out of the boll by storms and is also somewhat harder to pick than the big-boll varieties.

The Jackson cotton may be planted somewhat closer in the row than limbed varieties, but it is a mistake to crowd it too much.

Dixie cotton.—A wilt-resistant race developed from a plant of unknown parentage that appeared in the breeding plots of the Department of Agriculture in Alabama. The plant is somewhat of the Peterkin type, with numerous branches. The bolls are of medium size, color of seed variable.

This variety should be further improved by selection for larger bolls and greater productiveness.

TREATMENT OF COTTON WILT.

Nature of the disease.—Wilt, or black-root, is caused by a parasitic fungus which enters the roots from the soil and plugs the water-carrying vessels of the roots and stem. The two most prominent symptoms are the wilting of the leaves and the brown staining of the inner wood.

The wilt fungus lives many years in the land, even in the absence of a cotton crop. It can be somewhat reduced by rotation, but not entirely eradicated. It attacks no other crops than cotton and okra. Very similar wilt diseases caused by related fungi occur on the cowpea and the watermelon.

This disease is most troublesome in sandy or sandy loam soils and is much less serious in clay land. It is not caused by fertilizers nor can it be remedied by applications of fertilizers, though the resisting power of the two varieties described in this circular is intensified on land rich in humus or fertilized with stable manure.

Fungicides, such as sulphur, lime, or copper sulphate, applied to the soil are without beneficial effect. The only remedy is to plant a resistant variety, and farmers who can not secure seed of either the Dixie or Jackson wilt-resistant cotton should plant some other crop on their infected land.

The relation of root-knot to wilt.—Sandy land in the South is liable to be infected with a second disease, root-knot, due to a parasitic eel-worm, or nematode, which causes the root to form irregular swellings, or galls, and stunts or kills the plants. Root-knot occurs on many wild and cultivated plants—cotton, cowpeas, melons, tomatoes and other vegetables, peaches, etc. Though less destructive to cotton than is the wilt, when the two occur together it is more difficult for the wilt-resistant varieties to succeed, as the injuries made by the nematode afford a point of entrance for the wilt fungus. The best way to control root-knot is to rotate with immune crops, such as corn, oats, velvet beans, or peanuts, planting cotton only once in three years. The Iron cowpea, a disease-resistant kind introduced by the Department of Agriculture, may also be used; but all common varieties of cowpeas must be avoided, as, on account of their susceptibility to root-knot, they cause a great increase in the amount of this disease and are a source of loss rather than a benefit to the cotton grower.

A careful watch should be kept for root-knot, but it should not be confused with the beneficial tubercles formed on the roots of peas and other legumes by the nitrogen-fixing bacteria. These are small, uniform, and attached at one side of the root, so that they are easily rubbed off. Root-knot galls, on the other hand, are irregular enlargements of the root itself, varying from small to quite large swellings. Such swellings on cotton or melon roots are almost always root-knot.

MAINTENANCE OF WILT RESISTANCE.

Farmers receiving this seed should make every effort to keep it pure and further improve it by seed selection. If no care is taken in this direction, it will be likely to deteriorate.

Isolation.—When planted near other varieties more or less crossing takes place through the agency of bees and other insects which visit the flowers. It is better, therefore, to isolate the portion of the field grown for seed as much as may be practicable.

Roguing.—Whenever plants are observed to be affected by wilt or exhibit undesirable characters they should be pulled out before the seed they produce is mixed with the rest. Careful attention to this point will keep the crop up to an average standard.

Selection of seed.—Just before picking, go over the field and with great care select a few of the most productive and disease-resistant plants, having regard to the maintenance of a uniform type of plant and an increase in the size of bolls. Mark these selected plants with strips of cloth. Have them picked separately, and use the seed to plant a seed plot the next year from which enough seed can be had to plant the entire crop the second year.

REPORTS OF RESULTS.

Please assist the Department of Agriculture by reporting fully on the result of your trial of this cotton. A record is kept of all who receive seed, and an inquiry will be sent to each one at the end of the season.

W. A. ORTON,
Pathologist.

Approved :
B. T. GALLOWAY,
Chief of Bureau.

WASHINGTON, D. C., *February 19, 1907.*

